

CLAIMS

What is claimed is:

1. A method for protecting against cataract development in a subject,
5 during a vitreous replacement, comprising use of a vitreous replacement solution having
a low oxygen concentration.
2. The method of claim 1, wherein the oxygen concentration of the low-
oxygen-concentration solution is between about 0% and about 2%.
- 10 3. The method of claim 2, wherein the oxygen concentration is about 0%.
4. The method of claim 1, wherein the low-oxygen-concentration solution
includes reduced glutathione and ascorbic acid.
- 15 5. The method of claim 1, wherein the low-oxygen-concentration solution
includes reduced glutathione.
6. The method of claim 5, wherein the glutathione in the solution has a
20 concentration between about 0.01 mM and about 10 mM.
7. The method of claim 6, wherein the glutathione concentration is between
about 0.1 mM and about 2 mM.
- 25 8. The method of claim 7, wherein the glutathione concentration is about 1
mM.
9. The method of claim 1, wherein the low-oxygen-concentration solution
is an initial vitreous replacement solution from which at least a portion of the oxygen
30 has been removed.

10. The method of claim 9, wherein the at least a portion of the oxygen is removed by subjecting the initial solution to at least a partial vacuum.

11. The method of claim 10, wherein the initial solution is subjected to the at
5 least a partial vacuum for about 10 minutes to about 15 minutes.

12. The method of claim 9, wherein the at least a portion of the oxygen is removed by introducing an essentially-oxygen-free gas into the initial solution.

10 13. The method of claim 12, wherein the essentially-oxygen-free gas is an inert gas.

14. The method of claim 12, wherein the essentially-oxygen-free gas is a noble gas.
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15. The method of claim 12, wherein the essentially-oxygen-free gas is nitrogen gas.

16. The method of claim 12, wherein the essentially-oxygen-free gas is introduced into the initial solution by bubbling the gas through the initial solution, thereby producing a low-oxygen-concentration solution.
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17. The method of claim 16, wherein the gas is bubbled through the initial solution for about 10 minutes immediately prior to introduction of the low-oxygen-concentration solution into an eye of a subject.
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18. The method of claim 1, wherein the low-oxygen-concentration solution includes ascorbic acid.

19. The method of claim 18, wherein the ascorbic acid in the solution has a concentration that is sufficiently high to protect against cataract development in a subject.
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20. The method of claim 18, wherein the ascorbic acid concentration is between about 0 mM and about 10 mM.

21. The method of claim 20, wherein the ascorbic acid concentration is
5 between about 0.5 mM and about 5 mM.

22. The method of claim 21, wherein the ascorbic acid concentration is between about 1 mM and about 3 mM.

10 23. The method of claim 22, wherein the ascorbic acid concentration is about 2 mM.

24. Use of a vitreous replacement solution having a low-oxygen concentration during a vitrectomy, wherein the low-oxygen-concentration solution is
15 produced by removing at least a portion of the oxygen from an initial vitreous replacement solution.

25. The use recited in claim 24, wherein the low-oxygen-concentration solution includes reduced glutathione.
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26. A low-oxygen-concentration vitreous replacement solution for use in vitrectomies, wherein the low-oxygen-concentration solution is an initial vitreous replacement solution from which at least a portion of the oxygen has been removed.

25 27. The low-oxygen-concentration solution of claim 26, which includes reduced glutathione.

28. The low-oxygen-concentration solution of claim 26, which includes ascorbic acid.
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29. The low-oxygen-concentration solution of claim 26, which includes reduced glutathione and ascorbic acid.

30. A method for protecting against cataract development and/or for treating a cataract in a subject, comprising reducing oxygen concentration in a vitreous of the subject.